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# **DEVELOPMENTS AT SOVIET SOLID PROPELLANT PRODUCTION FACILITIES (TSR)**

**BE: Various**

**STRATEGIC WEAPONS INDUSTRIAL FACILITIES  
USSR  
APRIL 1979**

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INSTALLATION OR ACTIVITY NAME					COUNTRY
Developments at Soviet Solid Propellant Production Facilities					UR
UTM COORDINATES	GEOGRAPHIC COORDINATES	CATEGORY	BE NO.	COMIREX NO.	NIETB NO.
NA	See below	See below	See below	See below	See below
MAP REFERENCE					
ACIC. USATC; Series 200; Sheets 0156-1, 0156-11, 0159-23, 0161-2, 0161-21, 0165-15, 0167-18, 0234-22, and 0234-24; scale 1:200,000					
LATEST IMAGERY USED			NEGATION DATE (If required)		
See "Abstract"			NA		

Installation Name	Geographic Coordinates	Category	BE No	COMIREX No	NIETB MRN No
Biysk Solid Motor Production Plant I	52-29-05N 085-07-10E				
Biysk Solid Motor Production Plant II	52-28-50N 085-03-00E				
Biysk Solid Motor Test Area I	52-30-54N 085-05-00E				
Biysk Solid Motor Test Area II	52-31-19N 085-01-54E				
Kamensk-Shakhtinskiy Solid Motor Production Plant	48-17-50N 040-10-49E				
Pavlograd Solid Motor Production Plant	48-34-01N 035-49-12E				
Pavlograd Ordnance Research and Development Facility	48-30-30N 035-57-02E				
Pavlograd Solid Motor Assembly and Test Support Facility	48-26-58N 035-57-23E				
Pavlograd Solid Motor Test Facility	48-26-05N 035-58-17E				
Perm Solid Motor Production Plant	57-59-18N 055-53-30E				
Perm Munitions and Chemical Combine K. Kirov 98	57-58-07N 055-53-38E				
Kemerovo Solid Motor Production Plant	55-24-58N 085-58-32E				
Kemerovo Ammunition Loading and Explosives Plant Raketa 392	55-24-16N 085-58-15E				
Bryansk Ammunition Loading and Guided Missile Plant Seltso 121	53-24-02N 034-05-34E				
Sterlitamak Explosives and Solid Motor Production Plant 850	53-42-00N 055-58-07E				
Solikamsk Powder and Solid Motor Production Plant Borovsk	59-40-20N 056-42-52E				
Krasnoyarsk Explosives and Solid Motor Production Plant	56-02-36N 093-02-37E				

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**ABSTRACT**

1. (TSR) This report describes recent developments at 17 Soviet facilities involved in, or related to, the production of solid propellant rocket motors. Major plant expansion was observed at six production plants (Biysk Production Plants I and II, Kamensk-Shakhtinskiy, Pavlograd, Perm, and Kemerovo), at Pavlograd Ordnance Research and Development Facility, at Pavlograd Assembly and Test Support Facility, and at Biysk Solid Motor Test Area II. Upgrading and modernization continued at three production plants (Sterlitamak, Solikamsk, and Krasnoyarsk) and at two test areas (Biysk Solid Motor Test Area I and Pavlograd Solid Motor Test Facility).

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2. (TSR) One tactical- and one strategic-sized motor were being developed and/or static tested within the Biysk Complex during the reporting period. Production continued on one strategic-sized motor and on one tactical-sized motor at Kamensk-Shakhtinskiy. Two strategic-sized motors were in production within the Pavlograd Solid Motor Production Plant. Two tactical-sized motors and as many as three strategic-sized motors were in development within the Perm Complex. One tactical- and three strategic-sized motors were in development within the Kemerovo Plant. There are probably two tactical-sized motors in development at Bryansk Ammunition Loading and Guided Missile Plant Seltso 121. Renewed testing of launch assist devices (LADs) at the SS-17 LAD test position at Pavlograd Solid Motor Test Facility suggests that a follow-on to the SS-17 is in development.

3. (TSR) This report updates previous NPIC reports on each of the facilities and is based on all pertinent KEYHOLE imagery acquired through the information cutoff date of . The control numbers of the reports being updated and the current reporting period for each facility are as follows:

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Installation	NPIC Report Being Updated	Current Reporting Period
Biysk Solid Motor Production Plant I		
Biysk Solid Motor Production Plant II		
Biysk Solid Motor Test Area I		
Biysk Solid Motor Test Area II		
Kamensk-Shakhtinskiy Solid Motor Production Plant		
Pavlograd Solid Motor Production Plant		
Pavlograd Ordnance Research and Development Facility		
Pavlograd Solid Motor Assembly and Test Support Facility		
Pavlograd Solid Motor Test Facility		
Perm Solid Motor Production Plant		
Perm Munitions and Chemical Combine K. Kirov 98		
Kemerovo Solid Motor Production Plant		
Kemerovo Ammunition Loading and Explosives Plant Raketa 392		
Bryansk Ammunition Loading and Guided Missile Plant Seltso 121		
Sterlitamak Explosives and Solid Motor Production Plant 850		
Solikamsk Powder and Solid Motor Plant Borovsk		
Krasnoyarsk Explosives and Solid Motor Production Plant		

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A map, 44 photographs, and seven tables are included in this report.

## INTRODUCTION

4. (TSR) Each of the 17 facilities discussed in this report is involved in the production, assembly, or testing of solid propellant rocket motors or related components either for tactical or strategic delivery systems. Figure 1 shows the locations of these facilities within the USSR.

## BASIC DESCRIPTION

### Biysk Solid Motor Production Complex

5. (TSR) Biysk Solid Motor Production Complex (Figure 2) consists of four associated facilities that are involved in the development, production, and testing of solid propellant rocket motors.<sup>1</sup> Biysk Explosives Plant  is also within the complex but is not involved in rocket motor production and will not be discussed in this report. The four facilities include two production plants and two test areas. New construction and/or modifications to buildings were observed in both production plants, and new construction of buildings was observed in both test areas.

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#### Biysk Solid Motor Production Plant I

6. (TSR) Biysk Solid Motor Production Plant I contains a composite-modified double-base (CMDB) rocket motor production area and a double-base (DB) rocket motor production area. Two separately secured facilities, a fabrication area and an explosives storage and handling area, are closely related to these two production areas. Subsurface personnel shelters were under construction within the CMDB and DB areas. When seen on imagery of [ ] the shelter within the CMDB area was in the midstage of construction; this shelter is 23 by 17 meters. The shelter within the DB area was in the late stage of construction and is 24 meters square.

7. (TSR) The major plant expansion at Biysk I continues to be in the fabrication area and in the explosives storage and handling area. When complete, the fabrication area will contain four large fabrication buildings (Figure 3) with a total roof cover of 157,700 square meters; 11 administration/engineering buildings (Figure 3) with a total roof cover of 11,900 square meters (8,450 square meters of roof cover are complete); 13 support buildings; and one subsurface personnel shelter. This large fabrication area is connected to other sections of Plant I and to Plant II both by rail and road. If the total floorspace within this fabrication area is utilized for missile production, the capability of the Biysk Complex to produce and assemble both tactical and strategic rocket motors will be significantly increased.

8. (TSR) When seen on imagery of [ ] four probable warehouses (Figure 4), each 61 by 19 meters, were in the late stage of construction immediately north of the explosives storage and handling area. These warehouses will be rail served when they are completed. Footings for a large building near these probable warehouses may be for the expansion of the water treatment plant. A large fabrication/assembly building, 145 by 72 meters, was under construction west of the explosives storage and handling area.

#### Biysk Solid Motor Production Plant II

9. (TSR) Biysk Solid Motor Production Plant II contains three probable composite propellant rocket motor production lines and two probable rocket motor finishing and assembling lines. The production lines within Biysk Plant II are road and rail served. In addition to the production of composite propellant rocket motors, motors produced at Plants I and II are finished and assembled at Biysk Plant II.

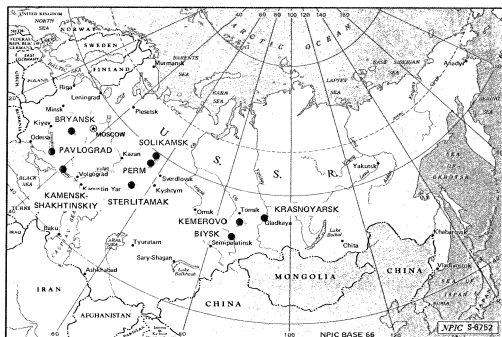


FIGURE 1. LOCATIONS OF SOVIET SOLID PROPELLANT PRODUCTION FACILITIES

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10. (TSR) Construction has continued on the second and third propellant production lines within Bysk Plant II. As of [redacted] both lines were externally complete and nearly operational. Two propellant mixers were being moved into one of the probable mix buildings in production line 2 when observed on imagery of [redacted] (Figure 5). The apparent volume of each mixer is [redacted] (8,200 liters or 2,166 gallons). The true volume, an internal measurement, of these mixers would be somewhat less. Ten additional mixers—probably identical to the first two—were seen on the ground near the ingredients preparation building within the original production line at Bysk Plant II, and five mixers were seen on railcars leading into the original line (Figure 6). The sighting of two new mixers in production line 2 indicates that construction was continuing within this line; the sighting of 15 mixers within production line 1 could indicate preparations for internal modifications to existing mix buildings either for capacity expansion and/or the introduction of new propellant grains for new missile systems. Alternatively, these mixers could also be in storage, possibly to be installed in lines 2 and 3.

\*Measurement of [redacted] is accurate to within [redacted] confidence interval, derived through standard error propagation techniques.

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11. (TSR) Other construction within Biysk Plant II included a new addition to the case preparation building within production line 1 and the construction of several nearby support buildings.

**Biysk Solid Motor Test Area I**

12. (TSR) No evidence of static test activity was observed at Biysk Test Area I during the reporting period. The only test activity observed was at the shell test range where the firing-in butt was being reinforced and strengthened, apparently because of continued shell testing. Table 1 lists the dates, dimensions, and locations of probable rocket motors and/or shipping containers /crates seen within the Biysk Complex since [REDACTED]. Analysis of the data in this table indicates that at least one tactical- and one strategic-sized rocket motor are currently in development within the Biysk Complex. Four probable expended rocket motors [REDACTED] meter in diameter were observed near the type B test cell. Motors of this size were also seen in this test area in October 1977. A large shipping crate [REDACTED] was on a railcar in front of the H-shaped missile assembly and checkout building on [REDACTED]. When seen on imagery of [REDACTED] a new addition to the missile assembly and checkout building was in the late stage of construction. This addition is 42 by 25 meters and was first observed under construction on imagery of [REDACTED].

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*Table 1. Dates, Dimensions, and Locations of Probable Rocket Motors  
and/or Shipping Containers/Crates Seen Within the Biysk Complex Since*

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*This table in its entirety is classified TOP SECRET RUFF*

Quantity	Description	Date Observed	Dimensions (m)			Location/Remarks
			L	W	Diam	
Biysk Solid Motor Test Area I						
1	Shipping crate					Near H-shaped assembly & checkout bldg
4	Prob expended rocket motors					Near type B test cell
Biysk Solid Motor Test Area II						
1	Unid cylindrical object					Outer and inner diams; on concrete apron near thrust block

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**Biysk Solid Motor Test Area II**

13. (TSR) Tests were probably conducted at the isolated test cell at Biysk Test Area II in May and September 1978. Possible test preparations were in progress on [REDACTED] when an environmental cover [REDACTED] was observed next to the thrust block (Figure 7). A large crane adjacent to the environmental cover and a van near the concrete apron further suggested that a test was to be conducted. The presence of an environmental cover near the thrust block routinely indicates pretest activity. No posttest evidence was observed because the test cell was not imaged again until [REDACTED]

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14. (TSR) Unusual activity was observed at the test cell on imagery of [REDACTED]. An unidentified cylindrical object with an inner diameter of [REDACTED] an outer diameter of [REDACTED] meters, and a height of [REDACTED] was observed in an upright position on the apron in front of the thrust block. The walls of the object were constructed so that light shows through the outer walls. A large crane was next to this object. No vans were present, and the environmental cover had been moved into the storage area. By [REDACTED] the object and crane were no longer at the test cell, and no evidence of a test was observed.

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15. (TSR) A probable test was conducted at the test cell between [REDACTED]. A cradle was observed directly in front of the thrust block on imagery of [REDACTED]. [REDACTED] a large crane was next to the thrust block and apparently was being used to lift an unidentified object. Although no expended rocket motor could be identified on [REDACTED] a blast mark was observed extending from the thrust block on that date. The crane remained in front of the thrust block through [REDACTED] but it had been removed by [REDACTED]

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16. (TSR) A large irregularly shaped structure 68 meters long and 30 meters wide was under construction approximately 675 meters east of the test cell (Figures 8 and 9). The structure could be a new test cell with a large thrust block. The new structure is on the side of a hill and has three parallel sections. The outer sections (a and b) are 5 and 13 meters wide, respectively, and appear to be made of concrete. The central section (c) is 12 meters wide. The portion of the structure which may be a thrust block support is 21 by 13 meters. An excavation is immediately in front of the structure and is below ground level in relation to the structure. The structure will probably be connected by cable to the control bunker at the isolated test cell. A trench and a conduit were being extended from the structure toward the test area and possibly also toward the control bunker.

**Kamensk-Shakhtinskiy Solid Motor Production Plant**

17. (TSR) Kamensk-Shakhtinskiy is a composite propellant plant where first-stage ICBM motors have been produced (Figures 10 and 11). Solid propellants for other missile systems may also be produced at this plant. Table 2 lists the dates, dimensions, and locations of probable rocket motors and/or shipping containers observed within the plant since [REDACTED]. The table indicates that at least two sizes of motors are produced within this plant—a strategic-sized motor approximately [REDACTED] and a tactical-sized motor approximately [REDACTED] meters.

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18. (TSR) A major plant expansion program has continued at this plant (Figure 12) since November 1977.<sup>1</sup> Two new propellant production buildings were under construction, and several existing propellant production buildings were being modified. The two new buildings are a probable casting/curing building and a new probable mix building immediately outside the northwest corner of the plant (Figure 13). Both buildings will be rail served when complete. The probable casting/curing building is 41 by 18 meters overall and is divided into two sections: one 30 by 18 meters and 19 meters high and the other 11 by 18 meters and 10 meters high. A probable casting pit is within the higher section; the outer diameter of the pit is [REDACTED] and the inner diameter is [REDACTED]. When seen under construction in July 1978, the pit was at least [REDACTED] below ground level. The probable mix building is 36 by 17 meters and 5 meters high. This building will be earth mounded when complete.

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19. (TSR) Existing propellant production buildings that were being modified include one mix building (Figure 14) and one casting/curing building. A [REDACTED] tunnel was under construction on the west side of the mix building. When complete, this tunnel will allow large railcars to enter the portal to this mix building. The installation of new rail lines near this mix building and the construction of a larger tunnel leading into this building suggest that the building could be modified for future use as a possible casting/curing building. Two additional buildings were under construction near this modified mix building.

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Table 2. Dates, Dimensions, and Locations of Probable Rocket Motors and/or Shipping Containers Seen Within the Kamensk-Shakhtinskiy Solid Motor Production Plant Since [redacted]

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Quantity	Description	Date	Dimensions (m)		Location/Remarks
		Observed	L	Diam	
7	Prob motors				Near finishing bldg
1	Prob motor				On railcar near finishing bldg
1	Prob motor				On railcar in case preparation area
1	Prob motor/container				On railcar near casting bldg
1	Prob motor/container				At entrance to plant
1	Prob motor/container				Near finishing bldg
3	Cylinders				At entrance to plant
					outer and inner diam
4	Prob shipping containers				Near entrance to plant

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20. (TSR) Two T-shaped buildings have been under construction since April 1977,<sup>1</sup> on either side of the middle casting/curing building within the original casting/curing area. The T-shaped building on the north side of this middle casting/curing building is externally complete; the T-shaped building on the south side was in the late stage of construction. These two buildings could possibly function as mix buildings for the middle casting/curing building.

21. (TSR) Four large probable shipping containers (Figure 15) were observed near the entrance to the plant on imagery of [redacted]. These containers were [redacted] meters in diameter. None of these shipping containers were present in October 1977. Three cylinders (Figure 16) with outer diameters of [redacted] inner diameters of [redacted] and heights of [redacted] were also observed at the entrance to the plant on [redacted]. Handling rings with outer diameters of [redacted] inner diameters of [redacted] and heights of [redacted] continue to be seen on railcars within the plant.

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Pavlograd Solid Motor Production Complex

22. (TSR) The complex consists of four facilities that are involved in the development, production, and testing of solid propellant rocket motors. Pavlograd Solid Propellant and Ammunition Loading Plant 55 [redacted] is also within the Pavlograd complex but is not involved in rocket motor production and will not be included in this report. Significant plant expansion was observed within three of the four facilities. Tables 3 and 4 list the dimensions of probable rocket motors and/or shipping containers/crates observed within the complex since [redacted]

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Analysis of the data contained in these tables indicates that at least two sizes of strategic motors are in development and/or production and static testing within the Pavlograd Complex. One of these motors, [redacted] in diameter (Figure 17), was observed on a railcar near a finishing building within the solid motor production plant on imagery of [redacted]

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Motors of a similar size have been seen at two research and development (R&D) facilities: at Moskva Solid Motor Production Plant Lyubertsy [redacted] and at Krasnoarmeysk Solid Motor Development Facility [redacted].<sup>2,3</sup> The concurrent sightings of rocket motors of similar sizes at these three facilities indicates that the Soviets are engaged in the research and probable prototype production of a new strategic rocket motor. The presence of this motor at Pavlograd indicates that prototype motors are probably being produced at Pavlograd. Recent expansion at the Pavlograd plant is further evidence that this plant could be involved in the development and production of a new strategic-sized rocket motor.

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Pavlograd Solid Motor Production Plant

23. (TSR) This plant is a composite solid propellant production plant which has been involved in the production of upper stage ICBM and IRBM motors. Rocket motors for other missile systems can also be produced at this plant.

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Table 3. Dates, Dimensions, and Locations of Probable Rocket Motors and/or Shipping Containers/Crates Seen Within the Pavlograd Solid Motor Production Plant Since

This table in its entirety is classified TOP SECRET RUFF

Quantity	Description	Date Observed	Dimensions (m)			Location/Remarks
			L	W	Diam	
1	Shipping crate					On railcar near finishing bldg
1	Shipping crate					On railcar near finishing bldg
1	Prob motor/container					On railcar near finishing bldg
1	Prob motor/container					On railcar near finishing bldg

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Table 4. Dates, Dimensions, and Locations of Probable Rocket Motors and/or Shipping Containers Seen Within the Pavlograd Solid Motor Test Facility Since

This table in its entirety is classified TOP SECRET RUFF

Quantity	Description	Date Observed	Dimensions (m)			Location/Remarks
			L	W	Diam	
1	Expend motor					In boneyard
1	Rocket motor					At thrust block
1	Unid cylinder					At entrance to test position
1	Prob motor					At entrance to test position; long without end caps
1	Motor/container					At entrance to test position; canvas-covered portion
1	Motor/container					At entrance to test position
1	Handling ring					At entrance to test 29 position; inner & outer diams
1	Expend motor					In excavation within boneyard
1	Poss motor					At thrust block
1	Motor					At thrust block
1	Motor/container					At entrance to test position
1	Prob motor					Protruding, canvas covered from thrust block
1	Motor/container					On transporter; overall length including nozzle long with diam
1	Motor/container					On ground near thrust block; overall length including long nozzle with diam
1	Motor/container					On ground near transporter; overall length including long nozzle with diam (may be same motor seen on)
1	Motor/container					Near thrust block
1	Motor/container					Near thrust block
1	Motor/container					On transporter near thrust block

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24. (TSR) Major expansion has been in progress at this solid motor plant since August 1977.<sup>4</sup> A new possible casting/curing building and a new possible mix building were under construction outside the east security wall of the plant (Figure 18). The new possible casting/curing building measures 18 by 13 by 9 meters. The door opening to this building is [REDACTED] wide and [REDACTED] high. The new possible mix building measures 36 by 15 by 5 meters. A large possible casting/curing pit was under construction east of the new possible casting/curing building. The outer diameter of the pit is [REDACTED] and the inner diameter is [REDACTED]. A building will probably be constructed over this possible casting/curing pit. Another building, 33 by 10 meters, was also under construction within this new area.

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25. (TSR) The new propellant area was being enclosed by a wall and joined to the existing plant. The new possible casting/curing building is road served only, but it will probably be rail served when complete. This new possible casting/curing building is larger than the road-served casting/curing building that was constructed in the northern part of the plant between June 1975 and February 1976. That casting/curing building (Figure 19) is 13 meters square.

#### **Pavlograd Ordnance Research and Development Facility**

26. (TSR) The primary function of the ordnance facility has been the research, development, and engineering of conventional high-explosive munitions. The presence of [REDACTED] missile-associated railcars, SS-17 missile canister sections, and SS-18 missile canisters suggests that this facility is also involved in the loading of LADs into SS-17 and SS-18 missile canisters.

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27. (TSR) The ordnance facility (Figure 20) consists of four separate areas: an engineering, fabrication and storage area; a new fabrication area; an explosives storage area; and a test area. Major plant expansion was occurring within the engineering, fabrication, and storage area and in the new fabrication area. Two new assembly/fabrication buildings, an addition to an existing assembly/fabrication building, a warehouse, and a probable administration/engineering building were under construction within the engineering, fabrication, and storage area. A total of 52,700 square meters of floorspace within this area is devoted to missile assembly and fabrication. SS-18 missile canisters have routinely been seen on three-car can/cap trains on rail sidings near older assembly/fabrication buildings within this area (Figure 21).

28. (TSR) One assembly/fabrication building and two support buildings were under construction within the new fabrication area. Total floorspace for assembly and fabrication within this area is 48,900 square meters. This includes an extremely large rail-served building with over 39,000 square meters of floorspace.

29. (TSR) A separately wall-secured area (Figure 22) is within the new fabrication area. The area contains a four-story barracks, a vehicle garage, an obstacle course, a gymnastics course, a theater, and a building under construction. This area could function as a strategic rocket forces (SRF) training facility or a housing area for security troops or visitors.

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30. (TSR) No significant activity was observed within the explosives storage or test areas during this reporting report.

**Pavlograd Solid Motor Assembly and Test Support Facility**

31. (TSR) Rocket motors and LADs for static testing at the Pavlograd Solid Motor Test Facility are finished at the solid motor assembly and test support facility. Motors have also been finished here for shipment to Votinsk Missile Final Assembly and Checkout Facility where completed airframes are assembled. Major expansion was in progress at this facility (Figure 23). At least five new missile assembly/checkout buildings were under construction, a covered rail siding has been constructed, and two existing buildings have been modified. When complete, the overall layout of the Pavlograd Solid Motor Assembly and Test Support Facility will be similar to that of the Votinsk Missile Final Assembly and Checkout Facility.

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32. (TSR) The facility is separated into three areas—a test cell area, a rail-served assembly and test support area, and a road-served assembly and test fire area for small rocket motors and explosives. A rail-to-road transfer point (RTP) is at the western corner of the facility (Figure 23). Two additions were being added to one of the laboratories within the test cell area. Five new missile assembly/checkout buildings were under construction within the rail-served assembly and test support area. When these buildings are complete, the facility will contain 14 rail-served assembly/checkout buildings with a total floorspace of 25,500 square meters, a significant increase over the existing 15,800 square meters of floorspace. This increase in the floorspace suggests either that new missile systems are to be introduced at this facility or that the facility will have a greater role in the finishing and final assembly of completed rocket motors. The only new construction associated with the road-served assembly and test fire area is the construction of a new RTP.

33. (TSR) The missile-associated railcars continue to be seen within the facility.

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**Pavlograd Solid Motor Test Facility**

34. (TSR) The solid motor test facility contains one horizontal test position and two test positions used to test fire LADs for the SS-17 and SS-18 missile systems (Figure 24).

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**Table 5. Summary of Activity at Horizontal Test Position  
Pavlograd Solid Motor Test Facility**

*This table in its entirety is classified TOP SECRET RUFF*

Date	Description	Remarks
	Posttest evidence & prob test preparations	Fresh blast mark extending from thrust block; large crane in front of thrust block; prob rocket motor on transporter; environmental cover near apron
	Prob early-test preparations	Environmental cover & large crane at thrust block; transporter nearby; first excavations along blast field
	Prob test preparations	Crane & environmental cover in front of thrust block; two cylinders present
	Prob test preparations	Same as <span style="border: 1px solid black; display: inline-block; width: 40px; height: 1.2em; vertical-align: middle;"></span> plus transporter
	Prob test preparations	Prob rocket motor near thrust block; large crane in front of thrust block; environmental cover near apron
	Prob test preparations	Same as <span style="border: 1px solid black; display: inline-block; width: 40px; height: 1.2em; vertical-align: middle;"></span> except environmental cover attached to large crane
	Prob test preparations	Crane near thrust block; prob rocket motor near crane; environmental cover near apron
	Prob test preparations	Large crane near thrust block; environmental cover at thrust block; prob rocket motor on transporter near apron; extension to environmental cover being moved to test position
	Late-stage test preparations	Unid canvas-covered object at thrust block; cylinder at entrance to test position; environmental covers & transporter in parked position—test to be conducted without use of environmental covers
	Prob test failure	Prob expended rocket motor at thrust block; burn marks on thrust block & on west wall of test position; large crane near thrust block, partial cleaning up of debris from test failure
	Poss test preparations	Poss rocket motor at thrust block; large crane near poss motor; transporter near apron; unid cylinder at entrance to test position
	Posttest evidence	Small burn mark; poss motor & crane near thrust block
	Test position inactive	Crane near entrance to test position
	Renewed activity	Crane at thrust block; handling ring on concrete apron
	Posttest evidence	Small burn mark
	Test position inactive	
	Prob test preparations	Prob rocket motor at thrust block; large crane near prob motor; environmental cover & unid container at entrance to test position; earth-mounded barricade perpendicular to blast field
	Prob late-stage test preparations	Environmental cover at test position; large crane in front of environmental cover; earth-mounded barricade complete & perpendicular to blast field

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**Perm Solid Motor Production Plant and Perm Munitions and Chemical Combine K. Kirov 98**

43. (TSR) The Perm Solid Motor Production Complex consists of Perm Solid Motor Production Plant and Perm Munitions and Chemical Combine K. Kirov 98 (Figure 31). The Perm Solid Motor Production Plant contains CMDB and composite production plants, a rocket motor test facility, and a final assembly and test facility. Perm Munitions and Chemical Combine K. Kirov 98 contains single- and double-base production plants, a small motor and propellants test facility, munitions and explosives storage areas, and a firing range. Expansion within the complex since [REDACTED] included construction of a new probable casting/curing building near the CMDB plant; completion of an earthen barricade at one of the mix buildings within the composite plant; additions to two support buildings within the composite plant; an addition to a missile checkout building in the rocket motor test facility; construction of two buildings within the final assembly and test area; construction of two subsurface personnel shelters within the DB plant; construction of a new warehouse north of the DB plant; and construction of two storage buildings within the munitions/explosives storage area. Construction within the composite plant and Perm 98 represents an upgrading rather than plant expansion.

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44. (TSR) Construction of a new probable casting/curing building near the CMDB plant represents an active expansion program. This building is east of and outside of the security wall of the CMDB plant; it is the third casting/curing building to be constructed or modified within the CMDB plant since July 1976.<sup>1</sup> This new building consists of two large probable casting/curing sections that are 14 meters square and 11 meters high and separated by a 34- by 22-meter five-bay central service section (Figure 32). Probable mix sections, 13 by 10 meters and 7 meters high, are next to each vertical service bay. Personnel passageways extend from both large probable casting/curing sections which indicate that this new building will be earth mounded when complete. The building is similar to several earth-mounded propellant production buildings within Biysk Solid Motor Production Plant II. A probable assembly/finishing building is 63 meters south of the new probable casting/curing building. This building is 60 by 16 meters with 5- and 10-meter-high sections. Three 12-meter-square service bays are in the higher section. Footings and door alignments between the probable assembly/finishing building indicate that these two buildings will be connected by rail.

45. (TSR) A conical object was observed on a railcar within the CMDB production plant on imagery of [REDACTED] (Figure 33). The object was [REDACTED] in diameter at the base, and [REDACTED] in diameter at the opposite end. Three bands divide the object into sections that are [REDACTED] long. The dimensions of the object are similar to those of a conical probable rocket motor observed at Perm in October 1975.<sup>2,4</sup> This object appears to be slightly more flared toward the base and has three bands that were not observed on the conical probable rocket motor. A probable shipping container, [REDACTED] long by [REDACTED] wide and [REDACTED] meters high, was observed on a flatcar near the conical object (Figure 33).

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46. (TSR) A suspect casting mandrel, [REDACTED] long overall, was observed in an open storage area within the CMDB production plant on [REDACTED]. The diameters of this suspect mandrel were [REDACTED] at one end and [REDACTED] at the other end.

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47. (TSR) Test activity or evidence of test activity was observed at the isolated test position in February, July, August, and September 1978. Evidence of a static test was observed on imagery of [REDACTED] when blast marks were seen extending from the thrust block. Initial preparations for a test were observed on [REDACTED] when a large environmental container, [REDACTED] was observed near the thrust block. This large container has been seen within several areas of the test position and is probably used to transport rocket motors from the production plant to the thrust block for static testing. Test preparations were seen again on [REDACTED]. The large environmental container, a large crane, and a small support van were near the thrust block on that date (Figure 34). A probable rocket motor, [REDACTED] long with a [REDACTED] diameter, was seen at the thrust block on [REDACTED]. This probable rocket motor may have been related to the [REDACTED] test preparations. Another probable rocket motor, [REDACTED] long with a [REDACTED] diameter, was seen at the thrust block on [REDACTED]. Table 6 lists the dates, dimensions, and locations of probable rocket motors and/or shipping containers that have been observed within the complex since [REDACTED]. Analysis of the data in this table indicates that at least three strategic-sized and two tactical-sized missile systems are in development at the Perm Complex.

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**Kemerovo Solid Motor Production Complex**

48. (TSR) Kemerovo Solid Motor Production Complex consists of the Kemerovo Solid Motor Production Plant and the Kemerovo Ammunition Loading and Explosives Plant Raketa 392 (Figure 35). Composite solid propellant rocket motors and complete rounds of conventional am-

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*Table 6. Dates, Dimensions, and Locations of Probable Rocket Motors and/or Shipping Containers Seen Within the Perm Solid Motor Production Complex Since*

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*This table in its entirety is classified TOP SECRET RUFF*

Quantity	Description	Date Observed	Dimensions (m)		Location/Remarks
			L	Diam	
1	Motor/container				On railcar within composite plant
1	Motor/container				On railcar within composite plant
1	Prob rocket motor				At thrust block
1	Motor/container				On railcar within composite plant
1	Prob rocket motor				At thrust block
3	Motors/containers				On ground within small test facility
11	Motors/containers				On ground within small test facility
9	Motors/containers				On ground within small test facility
1	Conical object				On railcar within CMDB area
1	Prob shipping container				On railcar within CMDB area

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Note:

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munition can be produced and tested at this complex.<sup>9</sup> The complex includes a composite solid motor production plant; a rocket motor test facility; a rocket motor and munitions storage area; a single-base solid propellant plant; a nitrocellulose processing area; a solvents area; a chemical processing area; a sulfuric acid plant; a nitric acid plant; an inert operations area; a probable Research Department explosive (RDX, cyclonite) plant; a probable tetryl plant; a probable trinitrotoluene (TNT) plant; an explosives-loading area; two explosives storage areas; a propellant-loading area; a probable initiator-loading area; a shell test-firing range; a propellant-burning ground; two explosives storage areas; an administration, support, and storage area; a new probable high explosives production plant; and a new heavily secured unidentified facility.

49. (TSR) The new explosives production plant (Figure 36) currently under construction is approximately 1 nautical mile (nm) east of the composite solid motor production plant. This new plant is double-fence secured and is road and rail served.<sup>10</sup> The plant contains 20 buildings, 12 of which were under construction. Access to five of these buildings will be provided by covered passageways that will eventually be earth barricaded. The functional arrangement of this new plant appears to be as follows: ingredients preparations in the west, propellant production in the center, and transshipment in the east. The location of this new plant between the probable RDX plant and the explosives storage areas of the Kemerovo Complex suggests that it will probably be a high explosives propellant production plant and most likely produce RDX and/or tetryl explosives. The ingredients preparation buildings within this new plant are similar to those within the Biysk Explosives Plant [ ] where RDX and tetryl explosives are thought to be produced.

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50. (TSR) The new heavily secured unidentified facility was under construction; it is approximately 1 nm northwest of the composite solid motor production plant (Figure 37). The facility is road served and both double-wall and double-fence secured. Additional security is provided by six guard towers positioned around the perimeter of the inner wall. The amount of security at this new facility indicates that it will be involved in sensitive work when complete. Six buildings, which included one large assembly/fabrication building and four dorr thickeners, were under construction within this new facility.

51. (TSR) Only minor construction activity has been observed in the remainder of the complex. Additions have been made to two storage buildings within the composite solid motor production plant. One of these additions, 24 by 13 meters, was to a storage building near the ingredients preparation area. The other addition, 31 by 24 meters, was to a storage building near the entrance to the plant.

52. (TSR) One nitrator building was destroyed within the probable RDX plant between [ ] [ ] Debris from this building was observed within and around the revetment for this building on imagery of [ ] When observed on imagery of [ ] the building was being rebuilt, and reconstruction of the building continued through [ ] [ ]

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53. (TSR) Two new waste settling ponds have been constructed within the waste settling pond area in the northwestern part of the complex. These additional ponds may have been built to service the wastes which will be created by the new explosives production plant.

54. (TSR) Several possible rocket motors and cylinders have been observed within the complex since July 1976. Table 7 lists the dates, dimensions, and locations of these possible motors and cylinders. This table indicates that four sizes of possible rocket motors are in production at Kemerovo and can be grouped into sizes of [ ] [ ] The largest motor, [ ] is similar in size to the postulated ABM-X-3 booster motor.<sup>1</sup> Motors/containers in this size range have been observed within the composite solid motor production plant since July 1972.

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55. (TSR) Although probable rocket motors were observed on railcars near the horizontal test cell building and on rail sidings within the rocket motor test facility, no evidence of test activity has been observed at the horizontal test building.

56. (TSR) Between October 1977 and February 1978, a total of 29 cylinders, possibly motors/containers, [ ] long with [ ] diameters, were observed in an open storage area near the oxidizer receiving and preparation building in the composite solid motor production plant (Figure 38). All of these cylinders had been removed from the plant by [ ]

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### Bryansk Ammunition Loading and Guided Missile Plant Seltso 121

57. (TSR) The primary function of Plant 121 is probably the assembly and loading of munitions and ordnance items, specifically warheads for AAMs, SSMs, and antisubmarine rockets.<sup>11</sup> The plant may also be involved in the production of small solid propellant rocket motors. This plant lacks the capability to produce acids needed in large-scale production of explosives.

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*Table 7. Dates, Dimensions, and Locations of Possible Rocket Motors and Cylinders Containers Observed Within the Kemerovo Solid Motor Production Complex Since July 1976*

*This table in its entirety is classified TOP SECRET RUFF*

Quantity	Description	Date Observed	Dimensions (m)		Location/Remarks
			L	Diam	
1	Poss rocket motor				On ground in rocket motor test facility
1	Poss rocket motor				On railcar in rocket motor test facility near test bldg
1	Poss rocket motor				On railcar in rocket motor test facility; diam not measurable
1	Poss rocket motor				On railcar in composite plant
1	Poss rocket motor				On railcar in rocket motor test facility
1	Poss rocket motor				On railcar in rocket motor test facility
29	Cylinders				On ground within composite plant
1	Poss rocket motor				On railcar near test bldg in rocket motor test facility
1	Poss rocket motor				On railcar near test bldg in rocket motor test facility
11	Cylinders				On ground within composite plant
1	Poss rocket motor				On railcar within composite plant; diam not measurable
1	Poss rocket motor				On railcar near test bldg in rocket motor test facility

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58. (TSR) Plant 121 consists of three separate sections: the main plant, a munitions loading plant, and a large explosives/munitions storage area (Figure 39). Each of these sections of Plant 121 is enclosed by a wall and served by both road and rail.

59. (TSR) The main plant area contains approximately 170 buildings and can be functionally divided into nine areas: a composite propellant rocket motor production plant; a probable rocket motor finishing area; an inert-components processing area; a propellants assembly and munitions loading area; two explosives/munitions processing areas; an explosives/munitions storage area; an administration and support area; and one small arms/shell test firing range.

60. (TSR) The large explosives/munitions storage area contains 31 road-served revetted storage buildings, six rail-served revetted storage buildings, and three revetted transshipment buildings.

61. (TSR) The munitions loading plant contains approximately 30 buildings, including seven rail-served revetted munitions assembly and transshipment buildings, two road-served revetted munitions assembly and transshipment buildings, one inert operations building, ten revetted igniter detonator fuze storage buildings, two new buildings under construction, seven administration/support buildings, and one steamplant.

62. (TSR) Very little new construction activity has been observed at Plant 121 since the previous NPIC report.<sup>11</sup> A subsurface personnel shelter, 22 by 18 meters, was in the late stage of construction within the inert processing area in September 1978. This is the second subsurface personnel shelter to be constructed at Plant 121. The first one was constructed within the explosives/munitions processing area in March 1974. Construction has progressed at an extremely slow rate on six buildings immediately north of the explosives/munitions processing area. One building was under construction within the support area in September 1978.

63. (TSR) Two types of crates and several unidentified cylinders have been observed along rail sidings within the transshipment area (Figure 40). One type of crate has three bands and is

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[REDACTED] The other type of crate has two bands and is [REDACTED] long and [REDACTED] wide. The cylinders are [REDACTED] diameters. They were first seen in May 1975. The crates were first observed in September 1977. Seven other unidentified cylinders, [REDACTED] long and [REDACTED] in diameter, were observed in the explosives/munitions storage area in October 1975 (Figure 41). These cylinders have not been seen again within the plant.

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### Sterlitamak Explosives and Solid Motor Production Plant 850

64. (TSR) Small rocket motors and propellants for conventional ammunition are produced and tested at Sterlitamak Explosives and Solid Motor Production Plant 850. Plant 850 consists of four main areas: a DB propellant plant, a rocket motor test facility, an explosives storage area, and a waste propellant storage area. The DB plant consists of seven parts: two nitroglycerin lines, two nitrocellulose lines, a rolling and extrusion area, a finishing and assembly area, and a conditioning and storage area. The rocket motor test facility contains two horizontal test cells, a shell test range, and a large H-shaped assembly/checkout building. The explosives storage area contains four rail-served storage buildings, eight road-served storage buildings, and three revetted fuze/igniter detonator buildings. The waste propellant storage area contains two burn pits, two earth mounded fuze detonator buildings, and one revetted control building.

65. (TSR) New building construction continued near the new nitroglycerin production line.<sup>1</sup> A possible glycerin heaterhouse has been constructed north of the large new nitroglycerin production building. This possible glycerin heaterhouse measures 28 by 7 meters and has four roof ventilators on the northern side (Figure 42). A possible buried glycerin holding tank is between the heaterhouse and the forced-draft cooling tower. The new cooling tower contains three ventilators. These buildings were in the late stage of construction on [REDACTED]. No nitroglycerin gutters have been constructed yet to connect the possible glycerin heaterhouse to the new nitroglycerin producing building.

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66. (TSR) One assembly/transshipment building in the final assembly area was constructed within Plant 850. This building measures 148 by 19 meters and will be rail served when construction is complete.

### Solikamsk Powder and Solid Motor Production Plant Borovsk

67. (TSR) Solikamsk Powder and Solid Motor Production Plant Borovsk contains a DB propellant production area, a small explosives storage area, two test areas, a waste treatment facility, and an administration and support area which includes a steamplant (Figure 43).

68. (TSR) Expansion of the plant and modifications to buildings have continued since [REDACTED]. This construction program represents an upgrading and modernization of the existing facilities rather than a major new plant expansion. Eleven buildings were under construction within the DB plant; these buildings include one new nitrator/separator building, four new buildings in the nitrocellulose production area, three new buildings near the waste treatment facility, and three new warehouse/transshipment buildings. One nitrator/separator building within the DB plant was removed, probably to be replaced by the new nitrator/separator building.

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69. (TSR) The new nitrator/separator building at Solikamsk (Figure 44) appears to be similar to the new nitroglycerin production building at Sterlitamak which suggests that a new nitroglycerin production line will be constructed at Solikamsk.

### Krasnoyarsk Explosives and Solid Motor Production Plant

70. (TSR) Krasnoyarsk Explosives and Solid Motor Production Plant consists of five functional areas: a single-base production area; a DB production area; a rocket motor test area, a munitions storage area; and a propellants disposal area.

71. (TSR) Since October 1977,<sup>1</sup> construction of new buildings within the plant for modernization and upgrading of facilities has continued. Two motor finishing/final assembly buildings, one laboratory/engineering building, and three support buildings were under construction in the southeast corner of the DB production area. The two motor finishing/final assembly buildings will be rail served when complete.

72. (TSR) Five buildings were under construction within the single-base production area. Three of these buildings are in the east portion of the single-base production area and will probably function as ingredients receiving and storage buildings when complete. The other two buildings are in the western part of the single-base production area and will probably serve as final assembly and transshipment buildings when complete.

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73. (TSR) A new ballistics test range was under construction on the south side of the rocket motor test area. This new range is similar to ones seen at Kemerovo Solid Motor Production Plant, Perm Munitions and Chemical Combine K. Kirov 98, and Solikamsk Powder and Solid Motor Plant Borovsk. The range contains three parallel, 49-meter-long firing lines. Each line is contained within a pipe which connects a 52- by 17-meter test building to a small triple-section impact bunker. An 8- by 6-meter building is near the test building and will be associated with this new range (Figure 45).

## REFERENCES

## IMAGERY

(TSR) All available KEYHOLE imagery acquired through the information cutoff date of [REDACTED] was used in the preparation of this report. The latest date of imagery used for each installation is presented in a table in the "Abstract."

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## MAPS OR CHARTS

ACIC. US Air Target Charts; Series 200; Sheets 0156-1, 0156-11, 0159-23, 0161-2, 0161-21, 0165-15, 0167-18, 0234-22, and 0234-24; scale 1:200,000 (UNCLASSIFIED)

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## REQUIREMENT

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(S) Comments and queries regarding this report are welcome. They may be directed to [REDACTED] Soviet Strategic Forces Division, Imagery Exploitation Group, NPIC, [REDACTED] 25X1  
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